Nursing 78 Book Selection

We all know that human interactions can alter heart rhythm. But when the interactions occur between nurse and patient, wouldn’t it help to know how much the patient’s heart rhythm is altered — and under what circumstances?

James J. Lynch, PhD, working with RN graduate students, attempted to determine precisely how human contact affects the heart. To do this, they studied patients in two acute clinical areas: a cardiac care unit and a shock trauma unit. Here’s what they discovered.

How do human interactions alter heart rhythm? Our research team from the psychosomatic clinics, the school of nursing, and the department of cardiology at the University of Maryland set out to study this phenomenon. To do this, we monitored the hearts of patients whose lives were in mortal peril. We began our work in a CCU.

First impressions of the CCU
When we entered the CCU, we were immediately struck by the strong emotions and fears generated there. Patients, staff, and visitors alike seemed absorbed in the intense atmosphere. As scientists conducting research, we were far from immune to the intense feeling of the unit.

The patients lay in beds, with needles in their arms, tubes in their noses, and sensors on their chests recording their every heartbeat on TV screens nearby. Helpless and dependent, they seemed very much alone.

The staff, watching those TV screens, tried to remain detached, yet compassionate, prepared for any emergency. How could they communicate with their patients? How could they reassure them?

We spent months in the CCU watching rows of heartbeats move rhythmically across the central monitoring TV screens, while the patients whose hearts were being monitored rested in beds 8 to 20 feet away.

We also observed the many types of human contact that occurred. Doctors and nurses visited patients. Family members came and went. Cleaning ladies mopped beside the beds; dietitians discussed luncheon menus; medical residents went on daily ward rounds. And yet, for long periods during the day, the rhythmical flash of each patient’s heartbeat was the only stimulus in an otherwise tranquil environment, assuring each of them that he was still alive, and not alone.

The “common sense” question
Many of the medical staff in the CCU already seemed to know how human interactions affect the heart. “Of course,” said one nurse, “everyone knows you have to measure a patient’s blood pressure several times to get an accurate reading.”

“Everyone knows that patients are sometimes frightened when a doctor first examines them,” said a medical resident. “Everyone” was certain that human interactions such as pulse taking could affect patients’ hearts — but no one in a CCU had ever analyzed it systematically. We began to un-

nderstand why. The search for scientific answers to this "common sense" question had to be conducted in a most uncommon way.

Since the patients were critically ill, we couldn't do anything to them that wasn't part of their routine clinical care. The experimental observations, therefore, had to be made in an environment over which we had little or no control.

**Miles of heartbeats**

We began our first study by simply plugging a recorder into the heart monitor of one of the patients, picked at random from among those in the unit. We continuously recorded his heart rate on a polygraph for 8 to 10 hours. Then, following this plan, we recorded the heart rates of 20 more patients — all of them admitted to the CCU at least 24 hours before our observations. Each patient's heart rate was recorded continuously for over an 8-hour period, and only one patient was monitored at a time. All events that occurred in the unit — alarms, noises, deaths — were marked on the polygraph immediately as they happened. Also, all personal contacts with the patient, including doctors' visits, nurses' interactions, and family visits, were immediately marked and coded on the
patient's heart rate record. Several of the nurses who helped conduct the study recorded and described all patient interactions in a logbook.

But even with these simple observational techniques, our task was monumental. To detect any change in the patient's beat-to-beat rate, we usually had to run the recording paper 25 mm per second. Running recording paper at that speed for 8 hours produced a paper record for one patient's heart rate that stretched for about half a mile. Then, to detect subtle changes in the heart rhythm of that patient, we had to examine the distance between each heartbeat. After we measured 20 patients for 8 hours each, the records of their heart rates stretched for almost 10 miles. (This type of analysis can now be done by computers in a few minutes.)

Each patient's heart record and reactions to human contact in the CCU quickly became a meticulously detailed cardiac biography coded in mile upon mile of paper records. Were it not for the fact that patients' heart reactions to such routine events as pulse taking seemed at times to be so striking, we might have abandoned the study.

A closer look
Many of the interactions we observed were multiple, such as a nurse coming to a bedside while a doctor examined a patient. So, we tried to focus on the simpler ones, such as pulse taking, blood pressure measurement, and relatives' visits. Also, we looked for times when the patient had rested quietly alone for at least 3 minutes before and after the interaction. We wanted to compare the patient's reactions to his usual, ongoing heart rate and rhythm. Were abnormal beats occurring before the nurse came to the patient's bedside? Was the frequency of such beats changed by her approach? Were cardiac changes limited to clinical interactions such as pulse taking, or did they occur with other types of human contact, too?

A case study
One of the first patients we monitored was a 72-year-old woman who had 2:1 heart block. We first observed a nurse taking her pulse, with the patient resting quietly for 3 minutes before and after. During the pulse taking, the patient's heart rate began to vary from its pattern of 2:1 block, changing back and forth from 2° to 1° block. In essence, her heart began to change from 30 beats up to 60 beats per minute (see Figure 1).

During two other episodes of pulse taking and one episode of blood pressure measurement, very similar cardiac reactions occurred. During one sequence, a nurse came to the patient's bedside sim-
ply to give her a pill. But during the entire minute the nurse was there, the patient’s heart rate changed abruptly from 2:1 block and 35 beats per minute to 70 or 75 beats per minute. This changed back abruptly to the original pattern during the 3 minutes after the nurse left the bedside. A similar reaction occurred when the nurse brought this patient lunch.

But, while this patient was still in heart block, one episode of pulse taking caused no heart rate or rhythm change.

Latter that day, the atropine which the cardiologist had prescribed took effect, and the patient was no longer in continuous 2:1 block. During this period, we again monitored an episode of pulse taking. This time the beat-to-beat heart rate both before and after pulse taking was approximately 70 or 75 beats per minute, with only periodic episodes of heart block occurring. When the nurse took the patient’s pulse, however, the heart rate was slightly elevated, the beat became quite rhythmic, and the periodic pattern of heart block was completely abolished.

This episode of pulse taking after atropine therapy (Figure 2) is an inverted mirror image of the cardiac reaction to pulse taking this same patient had shown earlier. With her type of cardiac problems and the medication she was given, we could understand the changes in her nervous system that caused these reactions. But that didn’t tell us just why the nurse’s interventions had these effects on the patient’s heart.

The effects of pulse taking
We began to see heart rhythm changes in other patients, and occasional changes in the frequency of abnormal heartbeats when people were at a patient’s bedside.

Sometimes, the frequency of these abnormal beats would increase; more often they would decrease; and sometimes there were no apparent changes. Why were these abnormal heartbeats occurring? Were these observations unusual? Were these patients unusual? Or were such heart reactions typical of coronary care patients?

Clearly, we’d have to monitor many more patients. We decided to concentrate on some type of human contact that was relatively simple, yet experienced by all patients in the unit. Pulse taking seemed to best fit this requirement.

We began to examine the effects of pulse taking on the heart rate and rhythm of over 300 cardiac patients, during the day and at night when they were asleep. Each pulse taking was examined only if the patient was resting alone for 3 minutes before and 3 minutes after this event. After monitoring these patients, we felt sure that even the routine event of pulse taking could alter the frequency of cardiac arrhythmia in CCU patients. For some of them, pulse taking completely suppressed arrhythmias that had been occurring. Clearly, the simple act of touching can have important influences on a patient’s heart rate and rhythm.

These observations raised many questions. Did pulse taking frighten the patients? (They were in a CCU and undoubtedly concerned with the status of their hearts.) Or did the pulse taking comfort them and reassure them that they were under continuous care? What specifically led to the changes in the frequency of arrhythmia? Did the patients move in bed or did their breathing change in ways not noticed? Or was it an emotional response?

An even larger question began to concern us: Was it only patients with cardiac pathology who reacted to human touch, or did patients without heart problems react similarly? These questions led us to shift our studies temporarily from the CCU to one of the most acute clinical areas in any modern hospital — a shock trauma unit.

Shock trauma patients
We moved our study, then, to a shock trauma unit, a more complex environment than the CCU. Patients there were suffering sudden and severe trauma and were often in a state of circulatory shock and coma. Most were in acute danger of death if multiple medical and surgical procedures were not performed immediately.

Also, many of these patients were much younger than those in the CCU, and most had no intrinsic heart pathology. Treatment sometimes involved extreme medical procedures. One of these was the use of d-tubocurarine chloride, which temporarily paralyzes every muscle in the body, yet leaves the person perfectly aware of what is going on. If conscious, the patient can hear and feel everything, although he cannot move a muscle.

The use of this drug allowed us to explore certain questions raised by our CCU observations. Would patients’ hearts react to human contact when the patients themselves could no longer move or change their breathing pattern, or when the patients had no discernible cardiac disease? In extreme cases, would these patients react to human touch even if they were delirious or in a deep coma?

We studied two types of human interactions. The first consisted of relatively simple, spontaneous clinical interactions, such as a doctor’s visit, in which neither patient nor staff was aware of being observed. The second type involved planned interactions in which nurses who were aware of the purpose of the study took the patient’s pulse, held

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his hand, or touched his arm and verbally comforted him. Whenever possible, we arranged for 3-minute resting periods before and after each type of interaction.

But even the simplest human interactions, like a nurse holding a patient’s hand, were difficult to study in this environment. Doctors and nurses were almost always at the patient’s bedside, and often as many as seven or eight doctors and four or five nurses were there at once.

Sometimes, we watched a curarized patient for 4 or 5 hours before a period occurred when he was alone for even 7 minutes — the minimum time necessary to evaluate his reactions. And, since we never knew when a patient would be curarized, we were on call 24 hours a day.

Three case studies
In spite of the large number of environmental stimuli bombing each patient, the common types of human contact seemed to produce dramatic changes in patients’ heart rates. For example, the heart rate of a 31-year-old woman critically injured in an automobile accident slowed almost 20 beats per minute when a nurse quietly took her pulse. When the episode was recorded, this patient had been in a coma for 2 days. A similar change in heart rate was observed in a severely injured, 30-year-old man when a nurse quietly held his hand.

We noticed something else about this second patient’s heart rate later in the day. At one point, seven doctors came on medical rounds to his bedside to discuss his case. Several minutes after they left, another doctor came in to perform tracheal suction on the patient. This uncomfortable procedure made it necessary for the doctor to periodically turn off the patient’s respirator during a 1-minute period — at which point the patient could no longer breathe. During this psychologically and physically distressing time, the patient’s heart rate increased. We were very interested in the fact that the heart rate increase was almost as great while the seven doctors chatted about this patient.

Finally, we observed the heart rate change in an 11-year-old girl when a nurse quietly held her hand. The child had been struck by a car, and had sustained a skull fracture and multiple fractures in her pelvis. She was in a coma when first brought to the shock trauma unit, and she gradually recovered during the next 8 days. Then suddenly, she became restless, confused, and in great respiratory distress. She was then curarized.

For the 3 minutes before a nurse approached her bedside, the girl’s heart rate was cycling rather rhythmically from a maximum of 125 beats per minute to a low of 105 beats per minute. We observed no unusual change in heart rate during most of the time that the nurse quietly held her hand. However, just as the nurse let go of the girl’s hand, her heart rate increased to a peak of 136 beats per minute, and then fell to about 95 beats per minute, before returning to the previous pattern. During the entire 7-minute period, the highest and lowest heart rates occurred within 30 seconds after the nurse released the girl’s hand.

Observations such as these — especially on curarized patients — take us to the very limits of our knowledge. We can never establish with 100% certainty that these heart rate changes would not have occurred by chance, and there is no way to repeat these observations conclusively to answer that question. All of them were individual and poignant human interactions, and from a scientific point of view, this unusualness must be recognized as both a strength and an unavoidable weakness. The events monitored in this study can never be exactly duplicated.

Conclusions — and more questions
The shock trauma heart rate data did show that the cardiac changes seen in the CCU were not limited to people with cardiac pathology. Our data also convinced us that the effects of holding a patient’s hand could be seen even in the most intense clinical environment. The more traumatic the environment became, the more important human contact seemed to be.

We encountered many variables that might have masked the effects we observed. For example, the “control periods” just before the human contact were by no means periods of quiet relaxation for the patients. And, the patients varied according to age, cardiovascular pathology, physiological status, and the types of medicines they were taking. Despite all these factors, we could still observe the effects of human contact.

Like all scientific endeavors, these observations have posed far more questions than answers. Some conclusions do emerge, however. Human contact seems to be desperately important to patients in these acute clinical settings and, in these environments, the heart seems almost hyperreactive to even the most ordinary types of personal contact. Perhaps by paying attention to these effects and to the emotional context of these interactions, we may be able one day to isolate the types of patients and kinds of social interactions that produce therapeutic benefits for the heart.

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